

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P01129-WO-00	FOR FURTHER ACTION <div style="float: right; font-size: small;">see Form PCT/ISA/220 as well as, where applicable, item 5 below.</div>	
International application No. PCT/US04/25958	International filing date (day/month/year) 11 August 2004 (11.08.2004)	(Earliest) Priority Date (day/month/year) 11 August 2003 (11.08.2003)
Applicant UNIVERSITY OF UTAH RESEARCH FOUNDATION		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

a. With regard to the language, the international search was carried out on the basis of:



the international application in the language in which it was filed.



a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☒ Unity of invention is lacking (See Box No. III)

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. _____



as suggested by the applicant.



as selected by this Authority, because the applicant failed to suggest a figure.



as selected by this Authority, because this figure better characterizes the invention.



none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/25958

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-44
- Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/25958

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C08K 3/04; C08F 293/00; C08L 53/00; G01N 33/20; A61K 38/43

US CL : 523/323, 299, 90; 436/73, 86; 424/94.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 523/323, 299, 90; 436/73, 86; 424/94.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
CAplus, Biosis, Medline, WPIDS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,087,452 A (STEWART et al.) 11 July 2000 (11.07.2000), column 3, line 5, through column 12, line 64.	1-44
Y	BROWN, K.C. et al. Determining protein-protein interactions by oxidative cross-linking of a glycine-glycine-histidine fusion protein. Biochemistry. 1998, Vol. 367, pages 4397-4406, especially pages 4398-4399.	1-44
Y	US 6,077,371 A (LUNDSTROM et al) 20 June 2000 (20.06.2000), column 4, lines 50-56.	6
Y	MICHON, T. et al. Horseradish peroxidase oxidation of tyrosine-containing peptides and their subsequent polymerization: A kinetic study. Biochemistry. 1997, Vol. 36, pages 8504-8513, especially pages 8507-8510.	3-5
Y	FANCY, D.A. et al. A critical role for tyrosine residues in Nis6Ni-mediated protein cross-linking. Biochem. Biophys. Res. Comm. 1998, Vol. 247, page 420-426, especially page 422)	1-44



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, u.e., exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

13 October 2005 (13.10.2005)

Date of mailing of the international search report

15 NOV 2005

Name and mailing address of the ISA/US

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BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-44, drawn to a method of crosslinking two moieties.

Group II, claim(s) 45-53, drawn to a method of crosslinking two proteins.

Group III, claim(s) 54-63, drawn to a method of conjugating a protein to a synthetic polymer.

Group IV, claim(s) 64-69, drawn to a method of immobilizing a protein on a polymer surface.

Group V, claim(s) 70-79, drawn to a material made by crosslinking a polymer.

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: They lack inventive unity a priori. The Groups are drawn to four distinct methods and a product that is not used by or made by any of said methods. Group I requires attaching metal ions to two moieties; Group II requires attaching HY-tags to two proteins; Group III requires attaching a metal-binding peptide to a protein and a ligand to a polymer; Group IV requires attaching a metal-binding peptide to a protein and somehow modifying a surface. None of these methods share starting products, process steps, or end points, and none of them result in or require the product of Group V, which is a composition comprising a polymer cross-linked to a metal. Because the Groups have no material common to all of them, they lack inventive unity a priori.